RELATIVITY STARTS VERBAL FIREWORKS

Prof. Einstein Encounters a Little Man Who Demonstrates Theory.

AUDIENCE SITS PUZZLED

Dr. Harrow Rather Dubious About Amount of Light Let in on Subject.

By BENJAMIN HARROW.

Prof. Albert Einstein delivered the fourth and last of a series of lectures yesterday afternoon at the College of the City of New York, dealing with various phases of his relativity theory. THE NEW YORK HERALD again asked Dr. Benjamin Harrow, associate in biochemistry at the College of Physicians and Surgeons of Columbia University, and author of "From Newton to Einstein," to report the lecture. His report, which discusses the third lecture also, follows:

Prof. Einstein does not use notes: he is evidently too full of his subject. One result of his extemporaneous effort was that at his second lecture, when he was scheduled to introduce us to the general theory of relativity, in distinction to his earlier or special theory, he still continued to talk on his special theory. Added to this delay there was still another. The professor allowed questions to be hurled at him at the beginning of the lecture. Most of us asked nothing—some because they knew German but no mathematics, and others because they knew mathematics but no German, and still others because they knew neither and had merely come to the lecture to spend an enjoyable hour in dreamland.

But there was one fellow full of fight who had made up his mind to floor the Professor. This little man spoke a German strangely reminiscent of Yiddish. He spoke and spoke and neither Professor nor audience could make head or tale of what he was driving at. Finally the Professor, in utter despair, suggested that he come to the board and illustrate. The little man did, and for more than fifteen minutes he discoursed on one system moving relative to another, until one nice lady near me muttered that the little gentleman was even less understandable than Einstein himself.

"M multiplied by C squared (where C is the velocity of light) is equal to E; M representing the mass and E the energy." This formula, explained the Professor, showed not only a very simple relationship between the mass and the energy of a particle, but actually pointed to the fact that mass and energy belong to one and the same fundamental entity. This outcome may be regarded as one of the outstanding features of the special theory of relativity.

Minkowski a Pioneer.

A factor of the utmost importance in the development of the theory was the work of a brilliant mathematician, Minkowski, who developed a four dimensional analysis, which not only included the customary three space variables—length, breadth and height—but also time. Time was of no greater importance than any one of the space coordinates. "If you move in one direction along the line time then you are in the future; if in the opposite direction, then you are in the past." So informs us the novelist Wells; "and to the man in the street," said Prof. Einstein, "the theory of relativity consists in the discovery of the fourth dimension." Of course, Minkowski's method of analysis merely put a powerful tool in the hands of Einstein.

The special or earlier theory had drawbacks. To begin with, it ignored that most universal property of matter—gravitation. Then again it dealt only with motions in a certain direction. But for a theory to be universally applicable it must include all motions—it must regard all motions as equivalent, and it must include gravitational phenomena. In this way we are inevitably led to the general theory, in contradistinction to the special theory of relativity.

The mathematical details involved in the development of the general theory were hardly touched upon by Prof. Einstein. And well it was that he did not; for outside of Prof. Kastner of Columbia, and perhaps Prof. Cohen of City College, and a few others whose fame has not reached me, I could think of none in that audience who could have followed him with very much profit.

The Origin of Gravitation.

Gravitational effects, according to Einstein, may be regarded as being due to accelerated motions. If we are in a train and it starts moving the result on us is a sudden push backwards. Now imagine such a body as the train constantly changing its velocity (exhibiting what we call an accelerated motion), and imagine still further that it is moving vertically, upwards instead of horizontally; and yet again, imagine this train so situated in space that it is completely removed from any other body so that no gravitational effects are possible. A man in this train will notice bodies falling to the ground just as they do on the earth, and this simply because the train is moving upward with an accelerated motion.

Prof Einstein next introduced his audience to a consideration of rotary motions, the outcome of which was to show that only non-euclidian mathematics would satisfy all the requirements. Here again Einstein was helped considerably by the work of Gauss, who had developed the mathematical technique of spherical or non-euclidian surfaces.

The gravitational equation that Einstein finally deduced proved itself to be more comprehensive than the Newtonian equation, for, unlike the latter, it could predict the extent or the bending of a ray of light coming from a fixed star and passing near a huge body like the sun. Furthermore, it explained to a nicety the motion of mercury. Not the least important in the Einstein equation is that, provided the velocities are small as compared to light, it reduces itself to Newton's law.

The third requirement of the theory, the shifting or spectral lines, has not yet been verified. Such is the sublime confidence of Einstein in his theory that, as he told his audience, "my theory either stands or falls on the result of this test."

Universe Shaped Like a Spheroid.

In concluding his third lecture Prof. Einstein lightly touched upon a fairly logical outcome of the relativity theory, namely that the universe is really finite; that it is probably shaped in the manner of a spheroid.

The fourth and last lecture dealt with the quantum theory, the "schmertzenskind" (the child of sorrows) of physics, as Einstein humorously described it. This quantum theory is really not Einstein's at all, but Planck's—another one of those extraordinary physicists at the university of Berlin. The idea underlying "quantum" is that radiations—say light radiations—are not sent out in continuous streams, but in small units called "quanta." These "quanta," though smaller than electrons, have definite weight and are of quite a fundamental nature. The theory has been applied with a great measure of success to spectrum analysis.

STOKES FINDS WIFE 'WANDERING PUSSY'

'Prowling Around With Other Cats at Night,' He Writes Children.

DIDN'T LIKE THE ANSONIA

Yearned for a Home of Her Own Rather Than the Big Broadway Hotel.

After Herbert C. Smyth, counsel for W. E. D. Stokes in the divorce action against Mrs. Helen Elwood Stokes, on trial before Supreme Court Justice Finch, read into the record yesterday letters and parts of letters passing between Mr. Stokes and Mrs. Emma Miller, mother of Mrs. Stokes, tending to show Mr. Stokes's solicitude for his wife and Mrs. Miller's cooperation with him in smoothing out domestic difficulties, Martin W. Littleton, counsel for Mrs. Stokes, introduced a letter by Stokes to his children, of a far different nature and calculated, according to the defence, to poison their minds against their mother.

"Dear Little Red-Top and Jim," it began. "Our pussy is a wandering pussy. She does not come near the house except at meal times, when she comes and insists on getting something to eat. The rest of the time she is gadding about. I cannot understand where she goes. I have seen her two or three blocks away from home at night, prowling around with other cats.

"It is awful. She has gotten into bad company and bad ways. She is not satisfied with the friendship of one cat, the nice big black one, but she wants to be running around with a hundred cats. Pretty soon I think she will be friendly with a thousand. From books before me it looks to me as if pussy is friendly with 1,000 tommy-cats, and she still keeps young and fools everybody about her age."

The letter was signed "Daddy." It was written September 11, 1920.

Mr. Littleton just finished reading the letter when Mr. Smyth called Justice Finch's attention that it was time for adjournment. Mrs. Miller had testified that her attitude toward Mr. Stokes had changed since 1916 because of improper language she heard him use before the children and letters he wrote them.

The letters between her and Mr. Stokes in 1916 and 1917 disclosed that Mrs. Stokes was dissatisfied with living in Mr. Stokes's Hotel Ansonia and on that account kept away from him pretty much until she was assured of a home of her own. "If she should decide to take up a home of her own, don't be suspicious of where she gets the money, as she has a remittance," Mrs. Miller wrote once. In another letter she said "We have all grown fond of you, and have no misgivings about money matters. We feel you will take care of Helen and the babies. We are not money mad."

"Had you any misgivings at the time that Mr. Stokes would take care of Helen and the children?" asked Mr. Smyth.

"You'll have to divide the question," she said.

"That he would take care of Helen?"

"Serious ones," she replied.

Mr. Smyth inquired at length into the financial resources of Mrs. Stokes independent of her husband and into the means whereby she came in possession of the jewels that were stolen from her on a train. Mrs. Miller asserted that she makes her daughter a generous allowance and that all the jewels were bought either by herself or Mr. Stokes or Mrs. Stokes herself.

While Border War Rages Against Rum Runners

Flood of Booze Sweeps Across Canadian Frontier

THRILLING BATTLES DAY AND NIGHT WITH SMUGGLERS

"Came the booze carriers, each weighed down with forty cases of whiskey. . . . And well back, the customs car thundering in the alcoholic wake with men precariously hanging on the running board, pistols ready. . . .

RUM-RUNNING from Canada into the United States has made the Eighteenth Amendment a joke to thousands of its violators, who maintain a steady stream of liquor pouring across the border.

The whiskey smugglers are so bold in their extensive operations that their law-defying activities are believed to be without parallel in this country.

To ascertain the actual facts, THE NEW YORK HERALD sent one of its staff men to the border, and the full report of his observations—amazing in fact and thrilling in detail—will be published as a leading Magazine Section feature in

Next Sunday's Herald

A Separate Eight-Page Sport Section

Featuring News and Special Articles pertaining to Big League Baseball activities by THE HERALD'S All-Star staff of Baseball scribes.

RACING NEWS by Henry V. King, with complete Charts of contests at the Havre de Grace track.

Other Sunday Herald Features That Will Add Enjoyment to Your Day of Rest!

Dreams Seen as Wholly Natural by Neurologist

Dr. Frederick Peterson.

WHAT'S in a dream? is a question that has been asked and answered in many ways.

Dr. Frederick Peterson, noted neurologist, presents a scientific explanation of dreams that adds a new and highly interesting chapter to the discussion.

See Magazine Section of Next Sunday's Herald.

How Russia Is Reacting To End of Bolshevism

Capt. Francis McCullagh.

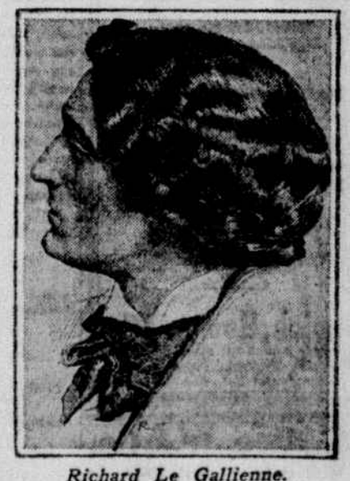
THE amazing details of Lenine's abandonment of Bolshevism—the great news beat of the year reported in The New York Herald—have been ascertained by Capt. McCullagh, The Herald's noted Russian correspondent, and will be published in full and exclusively in Magazine Section of Next Sunday's Herald.

Looks to Stage to Mend Present Day Morals

Miss Rachel Crothers.

DECADENCE in modern morals is the subject matter of a current play, "Nice People," the author of which, Miss Rachel Crothers, has given her critical views of the present day woman and explain how she believes most of the evils of modern society soon will disappear. See Magazine Section of Next Sunday's Herald.

Noted Critic Sees Dante As Great Modern Force



Richard Le Gallienne.

THE six hundredth anniversary of the mediæval author's death renews interest in the immortal poet's brilliant career.

Mr. Le Gallienne's review of Dante's works and deeds will be an illuminating feature of highly informative value in the Magazine Section of Next Sunday's Herald.

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